

# Claims

[c1] What is claimed is:

1. In a surveillance system comprising a master processing system and one or more sensor systems, said sensor systems being distributed throughout a surveillance area and in communications with the master processing system, a surveillance method comprising the steps of:  
at the master processing system:  
receiving, data streams from the sensor systems;  
analyzing, the received data streams to determine characteristics of a target situated within the surveillance area; and  
repeating, the above receiving and analyzing steps; and  
at the sensor systems:  
collecting, sensor specific stimulus (data);  
pre-processing, the collected data;  
applying, a matched extraction/compression scheme to the pre-processed data; and  
transmitting, the extracted/compressed data to the master processing system.

[c2] 2. The method according to claim 1 wherein the applying step comprises the steps of:

extracting, non-essential information from the pre-processed data; and compressing, using a compression scheme that is matched to the extraction, the pre-processed data having the non-essential information extracted.

- [c3] 3. The method according to claim 2, further comprising the steps of:
  - at the master processing system:
    - determining, based upon the analysis, whether additional information is to be provided by master processing system to a sensor system; and
    - sending, based upon the determination, any additional information from the master processing system to the sensor system.
- [c4] 4. The method according to claim 1 wherein the transmitting from the sensor system to the master processing system is performed via a wireless communications link.
- [c5] 5. The method according to claim 1, wherein each of the sensor systems include a sensor, responsive to sensor specific stimulus, said sensor being one selected from the group consisting of: acoustic, magnetic, seismic, chemical, and photonic sensors.
- [c6] 6. The method according to claim 2 wherein said extrac-

tion and compression steps result in at least a 100:1 reduction in data.

- [c7] 7. The method according to claim 1 wherein said pre-processing step includes the step of:  
converting, from an analog domain to a digital domain through the action of an analog/digital converter, the sensor specific data.
- [c8] 8. The method according to claim 3 wherein said determination is made as a result of a particular type of target surveiled.
- [c9] 9. The method according to claim 2 further comprising the steps of:  
generating, a sparse array of sensor systems from the one or more sensor systems distributed throughout the surveillance area.
- [c10] 10. The method according to claim 9 further comprising the steps of:  
modifying, the sparse array of sensor systems such that a new sparse array is generated from the one or more sensor systems distributed throughout the surveillance area.
- [c11] 11. Apparatus for the generic extraction and compression of information for surveillance to facilitate high per-

formance data fusion in distributed sensor systems, said apparatus comprising:

a master processing system for receiving and processing one or more data streams transmitted from one or more respective sensor systems distributed throughout a surveillance area; and

one or more sensor systems including:

a sensor, responsive to sensor-specific stimulus, producing a raw sensor data signal;

a pre-processor for processing the raw sensor data signal;

a matched, extractor/compressor for further processing the pre-processed signal;

a transmitter, for transmitting the further processed signal to the master processing system.

[c12] 12. The apparatus according to claim 11 wherein the pre-processor further comprises:

an analog/digital converter for converting analog raw sensor data signal to a digital signal representative of the raw sensor data.

[c13] 13. The apparatus according to claim 12 wherein the pre-processor further comprises:

one or more filters, for conditioning the digital signal.

[c14] 14. The apparatus according to claim 13, wherein the

extractor/compressor includes:  
an extraction module, for extracting non-essential information from the conditioned digital signal; and  
a compression module, for compressing the data signal having the non-essential information extracted;  
wherein the matched extraction/compression is optimally matched to the specific sensor type.

- [c15] 15. The apparatus according to claim 14 wherein the transmitter is a wireless transmitter.
- [c16] 16. The apparatus according to claim 15 wherein each of the sensor systems include a sensor selected from the group consisting of: acoustic, magnetic, seismic, chemical, and photonic sensors.
- [c17] 17. The apparatus according to claim 15 wherein the extractor/compressor produces at least a 100:1 reduction in data volume for transmission.